

WHAT IS CLAIMED:

1. A circuit interrupting device comprising:
  - a first electrical conductor capable of being electrically connected to a  
5 source of electricity;
  - a second electrical conductor capable of conducting electrical current to a load when electrically connected to said first electrical conductor;
  - a third electrical conductor capable of being electrically connected to user accessible plugs and/or receptacles where the first, second and third electrical conductors  
10 are electrically isolated from each other;
  - a movable bridge electrically connected to the first electrical conductor, said movable bridge capable of electrically connecting the first, second and third electrical conductors to each other;
  - a circuit interrupting portion configured to cause electrical discontinuity  
15 between said first, second and third electrical conductors upon the occurrence of a predetermined condition;
  - a reset portion configured to reestablish electrical continuity between the first, second and third electrical conductors after said predetermined condition occurs; and  
20 a reset lockout mechanism that prevents the reestablishment of electrical continuity between said first, second and third conductors if said circuit interrupting portion is non-operational.
2. The circuit interrupting device of claim 1 where the condition comprises a ground fault, an arc fault, an appliance leakage fault, equipment leakage fault or an  
25 immersion detection fault.
3. The circuit interrupting device of claim 1 further comprising a trip portion that is configured to cause electrical discontinuity between the first, second and third electrical conductors.

4. The circuit interrupting device of claim 3 where the trip portion comprises a test button having an angled end portion for engaging the latch plate.

5. The circuit interrupting device of claim 1 further comprising a sensing circuit for detecting the occurrence of the predetermined condition.

5        6. The circuit interrupting device of claim 1 where the circuit interrupting portion comprises a coil and plunger assembly, a latch plate and lifter assembly and a mechanical switch assembly for engaging a sensing circuit used to detect the condition.

7. The circuit interrupting device of claim 1 where the reset portion comprises a reset button attached to a reset pin which has a flange portion extending from  
10 and integral with its end portion.

8. The circuit interrupting device of claim 1 where the movable bridge is an electricity conducting spring arm mechanically biased away from the second and third electrical conductors.

9. The circuit interrupting device of claim 1 where the first electrical  
15 conductor comprises a contact connected to electric conducting material at least part of which extends outside of the housing.

10. The circuit interrupting device of claim 1 where the second electrical conductor comprises a contact connected to electric conducting material at least part of which extends outside of the housing.

20        11. The circuit interrupting device of claim 1 where the third electrical conductor comprises a contact connected to a conducting frame forming a receptacle that is accessible from outside of the housing.

12. A circuit interrupting device comprising:  
a first pair of terminals capable of being electrically connected to a source  
25 of electricity;  
a second pair of terminals capable of conducting electrical current to a load when electrically connected to said first pair of terminals;

a third pair of terminals capable of being electrically connected to user accessible plugs and/or receptacles where the first, second and third pair of terminals are electrically isolated from each other;

a pair of movable bridges electrically connected to the first pair of  
 5 terminals, said movable bridges capable of electrically connecting the first, second and third pairs of terminals to each other;

a circuit interrupting portion configured to cause electrical discontinuity between said first, second and third pairs of terminals upon the occurrence of a predetermined condition;

10 a reset portion configured to reestablish electrical continuity between the first, second and third pairs of terminals after said predetermined condition occurs; and

a reset lockout mechanism that prevents the reestablishment of electrical continuity between said first, second and third pairs of terminals if said circuit interrupting portion is non-operational.

15 13. The circuit interrupting device of claim 12 where the condition comprises a ground fault, an arc fault, an appliance leakage fault, equipment leakage fault or an immersion detection fault.

14. The circuit interrupting device of claim 12 further comprising a trip  
 20 portion that is configured to cause electrical discontinuity between the first, second and third pairs of terminals.

15. The circuit interrupting device of claim 14 where the trip portion comprises a test button having an angled end portion for engaging the latch.

16. The circuit interrupting device of claim 12 further comprising a sensing circuit for detecting the occurrence of the predetermined condition.

25 17. The circuit interrupting device of claim 12 where the circuit interrupting portion comprises a coil and plunger assembly, a latch plate and lifter assembly and a mechanical switch assembly for engaging a sensing circuit used to detect the condition.

18. The circuit interrupting device of claim 12 where the reset portion comprises a reset button attached to a reset pin which has a flange portion extending from and integral with its end portion.

19. The circuit interrupting device of claim 12 where the movable bridges are  
5 electricity conducting spring arms mechanically biased away from the second and third terminal pairs.

20. The circuit interrupting device of claim 12 where the first pair of terminals electrical conductor comprises a pair of contacts connected to electrical conductors at least part of which extend outside of the housing.

10 21. The circuit interrupting device of claim 12 where the second pair of terminals comprises a pair of contacts connected to electrical conductors at least part of which extend outside of the housing.

22. The circuit interrupting device of claim 12 where the pair of terminals comprises a pair of contacts connected to a conducting frame forming a pair of  
15 receptacles that is accessible from outside of the housing.

23. A GFCI device comprising:  
a housing;  
a pair of line terminals disposed at least partially within said housing and capable of being electrically connected to a source of electricity;  
20 a pair of load terminals disposed at least partially within said housing and capable of conducting electrical current to a load when electrically connected to said line terminals;  
a pair of face terminals connected to a pair of user accessible receptacles where each face terminal extends from and is integral with a metallic structure disposed  
25 within said housing;  
a pair of movable bridges each having two fingers and a bent end portion where each of the bent end portions is connected to a line terminal, said two fingers of each of the movable bridges are mechanically biased away from the line and load

terminals and said two fingers are capable of electrically connecting the line, load and face terminals to each other;

a circuit interrupting portion disposed within said housing, said circuit interrupting portion comprising a coil and movable plunger assembly, a biased  
5 mechanical switch assembly and a latch and lifter assembly where said latch having a circular opening is springingly and slidably coupled to said lifter which also has a circular opening, the movable plunger being positioned to engage the latch, and the lifter being positioned to engage the mechanical switch which engages a sensing circuit used to detect a predetermined condition and said lifter is also positioned to engage the movable bridges  
10 for connecting the line terminals to the load and face terminals;

a reset portion comprising a reset button attached to a reset pin said reset button and reset pin being mechanically biased, said reset pin having a circular flange extending from its end portion, said flange positioned to interfere with the latch when the opening of the latch is not aligned with the opening of the lifter and said flange and end  
15 portion extend through the opening of the latch and lifter when said latch is engaged by the movable plunger aligning the opening of the latch with the opening of the lifter and a recoil action by the latch causing a misalignment of the openings trapping the end portion and flange underneath the latch allowing the biasing of the reset pin and reset button to cause the flange to engage the lifter which engages the movable bridges causing the line  
20 terminals to be electrically connected to the load and face terminals; and

a reset lockout mechanism that prevents the reestablishment of electrical continuity between the line, load and face terminals if said circuit interrupting portion is non-operational.

24. The GFCI device of claim 23 where the pair of line terminals are metallic  
25 conductors with binding screws attached thereto where such binding screws are at least partially located outside of the housing.

25. The GFCI device of claim 23 where the pair of load terminals are metallic conductors with binding screws attached thereto where such binding screws are at least partially located outside of the housing.

26. The GFCI device of claim 23 where the user accessible receptacles are configured to receive an outlet plug.

27. The GFCI device of claim 23 where each movable bridge of the pair of movable bridges is a metallic strip having a connecting portion and a bent end portion,  
5 where the connecting portion comprises two fingers with each finger having a contact attached thereto for engaging corresponding face and load contacts and the connecting portion is mechanically biased away from the face and load terminals.

28. The GFCI device of claim 23 further comprises a sensing circuit for detecting faults where said sensing circuit is activated by the biased mechanical switch  
10 assembly engaged by the latch and lifter assembly resulting from an interference between the reset button and the latch and lifter assembly when the reset button is depressed.

29. The GFCI of claim 23 further comprising a trip portion configured to cause electrical discontinuity between the line, load and face terminals.

30. The GFCI of claim 29 where the trip portion comprises a test button  
15 having an angled end for engaging the latch.

31. A circuit interrupting device comprising:  
a first electrical conductor capable of being electrically connected to a source of electricity;

a second electrical conductor capable of conducting electrical current to a  
20 load when electrically connected to said first electrical conductor;

a third electrical conductor capable of being electrically connected to user accessible plugs and/or receptacles where the first, second and third electrical conductors are electrically isolated from each other;

a movable bridge electrically connected to the first electrical conductor,  
25 said movable bridge capable of electrically connecting the first, second and third electrical conductors to each other;

a circuit interrupting portion configured to cause electrical discontinuity between said first, second and third electrical conductors upon the occurrence of a predetermined condition; and

5 a reset portion configured to reestablish electrical continuity between the first, second and third electrical conductors after said predetermined condition occurs.

32. The circuit interrupting device of claim 31 where the condition comprises a ground fault, an arc fault, an appliance leakage fault, an equipment leakage fault, or an immersion detection fault.

10 33. The circuit interrupting device of claim 31 further comprising a trip portion that is configured to cause electrical discontinuity between the first, second and third electrical conductors.

34. The circuit interrupting device of claim 33 where the trip portion comprises a test button having an angled end portion for engaging the latch plate.

15 35. The circuit interrupting device of claim 31 further comprising a sensing circuit for detecting the occurrence of the predetermined condition.

36. The circuit interrupting device of claim 31 where the circuit interrupting portion comprises a coil and plunger assembly, a latch plate and lifter assembly and a mechanical switch assembly for engaging a sensing circuit used to detect the condition.

20 37. The circuit interrupting device of claim 31 where the reset portion comprises a reset button attached to a reset pin which has a flange portion extending from and integral with its end portion.

38. The circuit interrupting device of claim 31 where the movable bridge is an electricity conducting spring arm mechanically biased away from the second and third electrical conductors.

25 39. The circuit interrupting device of claim 31 where the first electrical conductor comprises a contact connected to electric conducting material at least part of which extends outside of the housing.

40. The circuit interrupting device of claim 31 where the second electrical conductor comprises a contact connected to electric conducting material at least part of which extends outside of the housing.

41. The circuit interrupting device of claim 31 where the third electrical  
5 conductor comprises a contact connected to a conducting frame forming a receptacle that is accessible from outside of the housing.

42. A circuit interrupting device comprising:  
a first pair of terminals capable of being electrically connected to a source of electricity;  
10 a second pair of terminals capable of conducting electrical current to a load when electrically connected to said first pair of terminals;  
a third pair of terminals capable of being electrically connected to user accessible plugs and/or receptacles where the first, second and third pair of terminals are electrically isolated from each other;  
15 a pair of movable bridges electrically connected to the first pair of terminals, said movable bridges capable of electrically connecting the first, second and third pairs of terminals to each other;  
a circuit interrupting portion and configured to cause electrical discontinuity between said first, second and third pairs of terminals upon the occurrence  
20 of a predetermined condition; and  
a reset portion configured to reestablish electrical continuity between the first, second and third pairs of terminals after said predetermined condition occurs.

43. The circuit interrupting device of claim 42 where the condition comprises a ground fault, an arc fault, an appliance leakage fault, equipment leakage fault or an  
25 immersion detection fault.

44. The circuit interrupting device of claim 42 further comprising a trip portion that is configured to cause electrical discontinuity between the first, second and third pairs of terminals.



45. The circuit interrupting device of claim 42 where the trip portion comprises a test button having an angled end portion for engaging the latch.

46. The circuit interrupting device of claim 42 further comprising a sensing circuit for detecting the occurrence of the predetermined condition.

5 47. The circuit interrupting device of claim 42 where the circuit interrupting portion comprises a coil and plunger assembly, a latch plate and lifter assembly and a mechanical switch assembly for engaging a sensing circuit used to detect the condition.

48. The circuit interrupting device of claim 42 where the reset portion comprises a reset button attached to a reset pin which has a flange portion extending from  
10 and integral with its end portion.

49. The circuit interrupting device of claim 42 where the movable bridges are electricity conducting spring arms mechanically biased away from the second and third terminal pairs.

50. The circuit interrupting device of claim 42 where the first pair of terminals  
15 electrical conductor comprises a pair of contacts connected to electrical conductors at least part of which extend outside of the housing.

51. The circuit interrupting device of claim 42 where the second pair of terminals comprises a pair of contacts connected to electrical conductors at least part of which extend outside of the housing.

20 52. The circuit interrupting device of claim 42 where the third pair of terminals comprises a pair of contacts connected to a conducting frame forming a pair of receptacles that is accessible from outside of the housing.

53. A GFCI device comprising:

a housing;

25 a pair of line terminals disposed at least partially within said housing and capable of being electrically connected to a source of electricity;

a pair of load terminals disposed at least partially within said housing and capable of conducting electrical current to a load when electrically connected to said line terminals;

5 a pair of face terminals connected to a pair of user accessible receptacles where each face terminal extends from and is integral with a metallic structure disposed at least partially within said housing;

a pair of movable bridges each having two fingers and a bent end portion where each of the bent end portions is connected to a line terminal, said two fingers of each of the movable bridges are mechanically biased away from the line and load  
10 terminals and said two fingers are capable of electrically connecting the line, load and face terminals to each other;

a circuit interrupting portion comprising a coil and movable plunger assembly, a biased mechanical switch assembly and a latch and lifter assembly where said latch having a circular opening is springingly and slidably coupled to said lifter which  
15 also has a circular opening, the movable plunger being positioned to engage the latch and the lifter being positioned to engage the mechanical switch for engaging a sensing circuit used to detect a predetermined condition and said lifter is also positioned to engage the movable bridges for connecting the line terminals to the load and face terminals; and

a reset portion comprising a reset button attached to a reset pin said reset  
20 button and reset pin being mechanically biased, said reset pin having a circular flange extending from its end portion, said flange positioned to interfere with the latch when the opening of the latch is not aligned with the opening of the lifter and said flange and end portion extend through the openings of the latch and lifter when said latch plate is engaged by the movable plunger aligning the opening of the latch with the opening of the  
25 lifter and a recoil action by the latch causing a misalignment of the openings trapping the end portion and flange underneath the latch allowing the biasing of the reset pin and reset button to cause the flange to engage the lifter which engages the movable bridges causing the line terminals to be electrically connected to the load and face terminals.

54. The GFCI device of claim 53 where the pair of line terminals are metallic conductors with binding screws attached thereto where such binding screws are at least partially located outside of the housing.

55. The GFCI device of claim 53 where the pair of load terminals are metallic  
5 conductors with binding screws attached thereto where such binding screws are at least partially located outside of the housing.

56. The GFCI device of claim 53 where the user accessible receptacles are configured to receive an outlet plug.

57. The GFCI device of claim 53 where each movable bridge of the pair of  
10 movable bridges is a metallic strip having a connecting portion and a bent end portion, where the connecting portion comprises two fingers with each finger having a contact attached thereto for engaging corresponding face and load contacts and the connecting portion is mechanically biased away from the face and load terminals.

58. The GFCI device of claim 53 further comprises a sensing circuit for  
15 detecting faults where said sensing circuit is activated by the biased mechanical switch assembly engaged by the latch and lifter assembly resulting from an interference between the reset button and the latch and lifter assembly when the reset button is depressed.

59. The GFCI of claim 53 further comprising a trip portion configured to cause electrical discontinuity between the line, load and face terminals.

60. The GFCI of claim 59 where the trip portion comprises a test button  
20 having an angled end for engaging the latch.

61. A circuit interrupting device comprising:  
a housing;  
a pair of line terminals disposed at least partially within said housing and  
25 capable of being electrically connected to a source of electricity;

a pair of load terminals disposed at least partially within said housing and capable of conducting electrical current to a load when electrically connected to said line terminals;

5 a pair of electrical conductors for electrically connecting the line terminals to the load terminals;

a circuit interrupting portion disposed within said housing, said circuit interrupting portion comprising a coil and movable plunger assembly, a biased mechanical switch assembly and a latch and lifter assembly where said latch having a circular opening is springingly and slidably coupled to said lifter which also has a circular opening, the movable plunger being positioned to engage the latch and the lifter being positioned to engage the mechanical switch for engaging a sensing circuit used to detect a predetermined condition and said lifter is also positioned to engage the pair of electrical conductors for connecting the line terminals to the load terminals;

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a reset portion comprising a reset button attached to a reset pin said reset button and reset pin being mechanically biased, said reset pin having a circular flange extending from its end portion, said flange positioned to interfere with the latch when the opening of the latch is not aligned with the opening of the lifter and said flange and end portion extend through the openings of the latch and lifter when said latch plate is engaged by the movable plunger aligning the opening of the latch with the opening of the lifter and a recoil action by the latch causing a misalignment of the openings trapping the end portion and flange underneath the latch allowing the biasing of the reset pin and reset button to cause the flange to engage the lifter which engages the movable bridges causing the line terminals to be electrically connected to the load terminals.

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62. The circuit interrupting device of claim 61 where the condition comprises a ground fault, an arc fault, an appliance leakage fault, equipment leakage fault or an immersion detection fault.

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63. The circuit interrupting device of claim 61 further comprising a trip portion configured to cause electrical discontinuity between the line and load terminals where said trip portion comprises a trip button having an angled end for engaging the

latch causing the opening of the latch to align with the opening of the lifter allowing the reset pin to disengage the lifter causing the line and load terminals to be disconnected from each other.

5           64.     The circuit interrupting device of claim 61 further comprising a pair of face terminals electrically connected to a pair of user accessible receptacles where each face terminals extends from and is integral with a metallic structure disposed within said housing.

          65.     The circuit interrupting device of claim 64 where the pair of electrical conductors are also configured to connect the line terminals to the face terminals.

10           66.     The circuit interrupting device of claim 64 where the pair of electrical conductors are configured to connect the line, load and face terminals to each other upon the device being reset and such conductors are configured to disconnect the line, load and face terminals from each other upon detection of a predetermined condition.

15           67.     The circuit interrupting device of claim 61 further comprising a sensing circuit for detecting the occurrence of the predetermined condition.

          68.     A circuit interrupting device comprising:  
                  a first electrical conductor;  
                  a second electrical conductor;  
                  a third electrical conductors;  
20                a movable bridge electrically connected to the first electrical conductor, said movable bridge capable of electrically connecting the first, second and third electrical conductors to each other and disconnecting said first, second and third electrical conductors from each other upon the occurrence of a predetermined condition; and  
                  a reset portion configured to reestablish electrical continuity between the  
25                first, second and third electrical conductors after said predetermined condition occurs.

          69.     The circuit interrupting device of claim 68 further comprising a circuit interrupting portion for causing electrical discontinuity between the first, second and third electrical conductors upon the occurrence of a predetermined condition.

70. The circuit interrupting device of claim 68 further comprising a reset lockout mechanism that prevents the reestablishment of electrical continuity between said first, second and third electrical conductors when said device is non-operational.